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EXAMINER				
SILVER, DAVID				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/615,772

**Applicant(s)**

LE RAVALEC-DUPIN ET AL.

**Examiner**

DAVID SILVER

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 February 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 27-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 27-42 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SE/US)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. Claims 27-42 are currently pending in Instant Application.
2. The Instant Application is not currently in condition for allowance.

***Response to Arguments***

***Response: 35 U.S.C. § 102/103***

**3. Applicants argue:**

- 3.1 "It is submitted that Sarda et al do not disclose associating with a reservoir model "a permeability field constrained by a priori geological data and production data and or pressure data obtained from well tests in said underground reservoir" (Remarks: page 6 bottom-page 7 top)

**4. Examiner Response:**

- 4.1 In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Attention is drawn to Huh, PGPUB para 0068, which discloses that the permeability field is interrelated with the pressure data, which renders the feature functionally equivalent. The reformatting of the equation (1) and solving for the permeability field would exemplify the issue. To show an example, " $X = \text{perm} + \text{pressure}$ " can be rewritten as  $\text{perm} = X - \text{pressure}$ . Accordingly, the equations are identical.

**5. Applicants argue:**

- 5.1 "Furthermore, step a) recites "constructing an initial reservoir model including generating a permeability field in accordance with a stochastic model coherent with the *a priori* geological data. The Examiner relies upon the Abstract and further column 3, lines 12-15. It is submitted that neither the Abstract nor column 3, lines 12-15, discloses the aforementioned subject matter. If the Examiner

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persists in the stated grounds of rejection, it is requested that he explain on the record how he is interpreting Sarda et al to disclose the subject matter of step a)." (Remarks: page 7)

6. **Examiner Response:**

6.1 In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

7. **Applicants argue:**

7.1 "Step b) recites "identifying zones inside said underground reservoir." The Examiner relies upon Fig. 2 and paragraph [0041] of Huh et al. It is submitted that a person of ordinary skill in the art would not interpret Fig. 2 and paragraph [0041] of Huh et al to disclose the foregoing subject matter. What is illustrated in Fig. 2 is "a fine-scale geological grid model" which is understood by persons of ordinary skill in the art to be a grid that is described in paragraph [0028] of the Brief Description of the Drawings which "could represent the reservoir area of Fig. 1 ."" (Remarks: page 7)

8. **Examiner Response:**

8.1 It appears Applicants are implicitly arguing features that are not claim. The claim merely recites identifying zones inside the reservoir. No further limitations are placed upon how the zones are determined, or what those zones are. A grid clearly identifies zones, each zone having a specific placement within the overall model.

9. **Applicants argue:**

9.1 "It is submitted that there is no description of calculating permeabilities of the zones using a simulator to simulate fluid flows for estimated simulating production or simulated pressure date [sic]." (Remarks: page 8)

9.2 "Moreover, Huh et al do not disclose "calculating permeabilities of zones". The Examiner's reference

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to paragraph [0041] is submitted to not disclose the claimed calculating permeabilities of said zones using a simulator to simulate fluid flows for estimated simulator production data or simulated pressure data as recited in the first part of step c) of claim 27." (Remarks: page 10)

**10. Examiner Response:**

10.1 Attention is respectfully drawn to Huh's Abstract, which discloses: "The model is then used in a simulator to simulate one or more characteristics of the formation." The determination of permeability is traversed above. The use of a simulator to estimate production data / simulate pressure data is disclosed in PGPU para 0051 of Huh: "The model may optionally further contain functions representing energy transfer between regions 16 and 17. Energy transfer functions may be desired for example to simulate the heat effects resulting from a steam flooding operation." Steam is liquid vapor, and the due to pressure differences (which inherently must be simulated) is moved from one region to another. The inherency must be simulated because otherwise, the simulator as disclosed by Huh would not know how to properly move energy from one region to another. Further, attention is also drawn to Huh's PGPU para 0056, which discloses: "1-D gas injection models can be used to investigate the sensitivity of reservoir performance to variations in process parameters and to interpret laboratory displacement tests."

10.2 Regarding subsection 2 *supra*, in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

**11. Applicants argue:**

11.1 "However, it is submitted that this subject matter does not suggest to a person of ordinary skill in the art "an iterative optimization process comprising minimizing a function which depends on said corrections, using a technique of gradual deformation realizations of said stochastic model"." (Remarks: page 11)

**12. Examiner Response:**

12.1 Attention is drawn to Huh's PGPUB para 0009, which recites: "In order to analyze a phenomenon changing in time, it is necessary to calculate physical quantities at discrete intervals of time called timesteps, irrespective of the continuously changing conditions as a function of time. Time-dependent modeling of the transport processes proceeds in a sequence of timesteps." Because the simulation and calculation is performed for different time steps, it inherently iterates through time and therefore the calculation is an iterative process. The system disclosed in the overall Huh's system is one of optimization; therefore, the optimization contains an iterative process, and the process is an iterative optimization process. The connections are disclosed in PGPUB para 0010, which recites: "A link between two nodes is called a 'connection.' Fluid flow between two nodes is typically modeled as flow along the connection between them."

**13. Applicants argue:**

13.1 "Moreover, the Examiner has not set forth any rationale why a person of ordinary skill in the art would be motivated to combine the teachings of Sarda et al and Huh et al for any reason. It is noted that Huh et al's system pertains to" (Remarks: page 11)

**14. Examiner Response:**

The motivation was set-forth in the rejection of claim 27. Specifically, the motivation to combine would be to use zones which allows for faster and better simulation results because breaking things down to zones / grids allows for the simulation to have a better physical representation of the reservoir, as the simulations become faster and more accurate (**Huh: 0064**). In response to applicant's argument that no motivation was provided, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). In this situation, one would have been motivated because zoning lends the system to parallel computing which is an implicit advantage of breaking models down by grids / zones / granularities.

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On page 12 of the remarks, first full paragraph, Applicants appear to argue impermissible hindsight, however, attention is drawn to the above traversals which indicate reasons other than those provided by Applicants. Further, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. Claims 27-28, 35, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarda (**US 6064944**), and further in view of Huh (**US 20060020438**).

Sarda discloses: 27. (Currently Amended) A method for constructing a reservoir model representative of an underground reservoir, including discretizing said underground reservoir by a set of grid cells, and associating with said reservoir model a permeability field constrained by a priori geologic data and production data or pressure data obtained from well tests collected in said underground reservoir comprising (**Fig 1 and description; col: 8 line: 55-57**):

a) constructing an initial reservoir model including generating a permeability field in accordance with a stochastic model coherent with the a priori geologic data (**Abstract: "physically exploring the original reservoir based on the determined physical property"; col: 3 line: 12-15**);

Sarda however does not fully disclose the following limitations, which are disclosed by Huh's analogous

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simulation system.

b) identifying zones inside said underground reservoir (**Fig 2; para 41**);

c) calculating permeabilities of said zones (**para 41**),

using a simulator to simulate fluid flows for estimating simulated production data or simulated pressure data (**Fig 5A and description**), and

estimating corrections of said permeabilities for reducing a difference between said production data or pressure data obtained from well tests and said simulated production data or simulated pressure data (**para 104: "permeability-saturation relationship and dispersion level) were set to match the experimentally determined values"**);

d) propagating said corrections to said set of grid cells of said reservoir model by an iterative optimization process comprising minimizing a function which depends on said corrections, using a technique of gradual deformation of realizations of said stochastic model (**para 0009**); and

e) using said reservoir model, including said corrections propagated to said set of grid cells, to develop said underground reservoir (**col: 1 line: 11-13**).

It would have been obvious to one of ordinary skill in the art <oil reservoir modeling> at the time of Applicant's invention to combine the references in order to have a finer granularity for the grids / zones. Thus, allowing, for a better and more accurate simulation, which in turn saves time and money associated with developing a reservoir based on incorrect or inadequate simulation outputs.

Sarda discloses: 28. (Previously Presented) The method as claimed in claim 27, comprising using said reservoir model to develop an oil reservoir (**col: 1 line: 11-13**).

Huh discloses: 35. (Previously Presented) the method as claimed in claim 27, wherein at least one gradual deformation parameter is assigned to each of said zones (**para 0009**).

As per claim 36, note the rejection of claim 35 above. The Instant Claim recites substantially same limitations as the above-rejected claim and is therefore rejected under same prior-art teachings.

16. Claims 29-34, and 37-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sarda (**US 6064944**), and further in view of Huh (**US 20060020438**), as applied to claim 27, and further in



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view of Cullick (**US 6,549,879**).

As per claim 29, the combination of Sarda and Huh fully discloses claim 27. The combination however does not expressly disclose: A method as claimed in claim 27, wherein flow simulation is carried out by means of a streamline simulator, said zones of said underground reservoir are identified by a set of grid cells traversed by one or more streamlines of fixed geometry and said zones are defined either manually or automatically from said flow simulator. Cullick however discloses the said feature (**col: 5 line: 33-39, col: 7 line: 40-51**). It would have been obvious to use the streamline simulation as it is significantly faster than traditional permeability simulations and thus saves time and costs associated therewith.

As per claim 30, the combination of Sarda and Huh fully discloses claim 27. The combination however does not expressly disclose: A method as claimed in claim 27, wherein flow simulation is carried out by means of a streamline simulator, said zones of said underground reservoir are identified by a set of grid cells traversed by one or more streamlines of fixed geometry and said zones are defined either manually or automatically from said flow simulator. Cullick however discloses the said feature (**col: 5 line: 33-39, col: 7 line: 40-51**). It would have been obvious to use the streamline simulation as it is significantly faster than traditional permeability simulations and thus saves time and costs associated therewith.

Sarda discloses: 31. (Previously Presented) The method as claimed in claim 27, wherein said zones are identified as volume portions on a periphery of wells running through said reservoir (**Abstract: "identifying a volume portion of the equivalent medium"**).

As per claims 32-34, note the rejection of claim 31 above. The Instant Claims recite substantially same limitations as the above-rejected claim and are therefore rejected under same prior-art teachings.

Huh discloses: 37. (Previously Presented) the method as claimed in claim 27, wherein at least one gradual deformation parameter is assigned to each of said zones (**para 0009**).

As per claims 38-42, note the rejection of claim 39 above. The Instant Claims recite substantially same limitations as the above-rejected claim and are therefore rejected under same prior-art teachings.

***Support for Amendments and Newly Added Claims***

Applicants are respectfully requested, in the event of an amendment to claims or submission of new claims, that such claims and their limitations be directly mapped to the specification, which provides support for the subject matter. This will assist in expediting compact prosecution. MPEP 714.02 recites: "Applicant should also specifically point out the support for any amendments made to the disclosure. See MPEP § 2163.06. An amendment which does not comply with the provisions of 37 CFR 1.121(b), (c), (d), and (h) may be held not fully responsive. See MPEP § 714." **Amendments not pointing to specific support in the disclosure may be deemed as not complying with provisions of 37 C.F.R. 1.131(b), (c), (d), and (h) and therefore held not fully responsive.** Generic statements such as "Applicants believe no new matter has been introduced" may be deemed insufficient.

***Requests for Interview***

17. In accordance with 37 CFR 1.133(a)(3), requests for interview must be made in advance. Interview requests are to be made by telephone (571-272-8634) call or FAX (571-273-8634). Applicants must provide a detailed agenda as to what will be discussed (generic statement such as "discuss §102 rejection" or "discuss rejections of claims 1-3" may be denied interview). The detail agenda along with any proposed amendments is to be written on a PTOL-413A or a custom form and should be faxed (or emailed, subject to MPEP 713.01.I / MPEP 502.03) to the Examiner at least 3 days prior to the scheduled interview.

18. Interview requests submitted within amendments may be denied because the Examiner was not notified, in advance, of the Applicant Initiated Interview Request and due to time constraints may not be able to review the interview request to prior to the mailing of the next Office Action.

***Conclusion***

19. All claims are rejected.

20. The Instant Application is not currently in condition for allowance.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set

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forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Silver whose telephone number is (571) 272-8634. The examiner can normally be reached on Monday thru Friday, 10am to 6:30pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on 571-272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Kamini S Shah/

Supervisory Patent Examiner, Art Unit 2128

/ DS /  
David Silver, Patent Examiner  
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